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20. That the *Persians* are exquisitely skilful in damaskining with Vitriol ; but that the nature of the Steel by them used contributes very much to the good workmanship, they not being able to do so well with their own or our Steel. This Steel they fetch from *Golconda*, which is the only kind known that can be well damaskined. And 'tis very differing from ours : For, when 'tis put to the fire to temper it, they very carefully give it only a little redness like that of a cherry-colour, and instead of quenching it in water, as we do, they only wrap it in a wet piece of Linnen cloth ; for, if they should give it the same degree of heat that we do to ours, it would grow as brittle as glass.

21. That the *Persian* Countrymen about *Ispahan*, coming every morning to fetch away all manner of the ordures of the Town to dung their land withal, take up much rather the excrements of the *Armenians*, *Jews* and *Franks*, because they drink wine, than those of the *Persians*, that generally drink none.

22. That in *Persia* they make the running of Foot-men a Trade, by breeding them up to it, and with solemnity receiving him for Master of the Trade who performs the Master-piece of running 36 common Leagues in a day, from Sun-rising to Sun-setting.

*So far the Observations of the first Volume; those of the second we shall reserve for the next opportunity.*

*A Description of Mr. John Coniers, Apothecary and Citizen, his Hygroscope, in two several Contrivances ; together with some Observations made thereon : Communicated in a Letter to the Publisher, Octob. 23. 1676.*

S I R,

I Thought it necessary to acquaint you, that in my diversions, among many (at least 40) several Trials, made by me for the readiest and best discovery of the Change or Temperature of the Air and Weather, I have found out, that by applying a Hand and a Circular Index or a Quarter-circle to a Pannel made of duly seasoned Deal-wood, and that divided or slit in two parts playing loose in a groove, and only fastned to the frame at each end (as you may see by the figures, accompanying these lines,) you have one of the best, if not the very best contrivance for that purpose. I have made two several Contrivances of it, the one I invented and contrived about five or six years since, here explained in the first Figure, together with some Observa-

tions

tions, by me made thereon during that time; the other, some years after the former: Both which I thought fit to communicate to you, to dispose of them as you shall think good.

*So far the Letter:* Which, together with the Invention and Contrivance it self, therein mentioned, the Publisher would have given notice of ere this, and at the time, when in *N. 127.* of these Tracts the like Invention, imparted from *Dublin*, was described, if he had not then been altogether un-acquainted therewith. Wherefore, to do right to the Ingenuity of this Inventor, the Description of this his Instrument, in its two several contrivances, shall now be faithfully set down here, together with the Observations made by the former of them.

*The Explanation of the first Contrivance in Figure I.*

**AAAA,** The Frame of wood for the two pannels of Deal to play loose in at top and bottom, to which at the two ends they are fastned.

**BB,** The two pannels of slit-Deal, three foot deep, and three foot broad apiece, with a distance left in the middle for the scope of the motion.

**C,** The Hand placed or fastned by the Axletree to the plate, and also with Nail-holes which are to fasten it to the middle of the Pannel within half an inch of the scope for motion; at the lower or shorter end of which Axletree there is, by a wire like an S, fastned a small Silver-chain within a straws breadth of the Axletree; which Chain is to be carried and placed cross the distance between the two pannels, and fastned to the Pannel opposite by a brass noose, through which it is to slip, so as that it may be taken up or let down at pleasure.

**D,** The Roller with a weight annexed, which by a string is fastned to the lowest end of the hand **C**; so that as the Relax gives way, the Weight will adjust the motion of the hand to the Index **E**.

**E,** The Index of Paper, pasted upon the opposite pannel to the hand, and so, as it is in this figure, placed near the top, for the better advantage of the Hands motion; and this Index, being but a quarter of a Circle, is divided into inches more or fewer according to the scope which the Pannels hand requires for their motion; but when the Relax shall require more room for the hand, then the chain is to be taken up one link more, and so

so you will be ready for more play upwards and downwards : Which taking up may yet be again repeated, when there is occasion, or the time of year requires it.

Now if the Chain be placed near the Axletree, the motion will be the nicer and larger ; if farther off, then it will be less : For Example, the motion of 2 more than that of 3, and 3 than that of 4, &c. as you may perceive by the figures 2, 3, 4, 5, 6 ; which are placed in this figure by the lower end of the hand near below the Axeltree thereof.

From this contrivance it was, that I have for this five or six years past made these following Observations.

1. That these Pannels of Deal-wood will move by shrinking most in Summer, and swelling most in Winter-seasons ; but will vary from this, according to the change to the then more or less heat or cold, moisture or drought that the temper or season of the year, such as Spring and Fall, do produce ; it being then more apt to swell or shrink on the sudden, but not attaining then to the highest shrinking or swelling, as in Summer and Winter it doth.

2. That for the most part, especially in the Spring and Summer-time, this Motion happens only in the day time ; for then generally all night it rests, and moves very seldom.

3. That one kind or manner of this Motion happens in dry fair weather, but sometimes in the fore-part of the forenoon, and sometimes not until the latter part of the forenoon, and then at that time it relaxes or swells the Deal for about two or three hours ; more, seldom ; less, often ; and then all the afternoon after shrinks ; nay, sometimes even when a small Rain hath newly fallen, or is then falling ; and this not so often, but more seldom in Winter, or cold moist weather.

4. This shrinking is gradual very often, or for the most part a little after a moist time (*viz.*) the first day after moisture it shrinks a little, the second day more, and so yet more according to the then time of year, and as it is then inclined to moisture or drought, and alteration of the wind and the then heat or cold.

5. The winds being in the North, North-East, and East, winter and summer, for the most part at that time the Deal shrinks in the night also as well as in the day ; but not so much : which is a sign of drying weather, and sometimes of frost or cold in Winter ; heat or scorching in Summer, in a clear day. But on the contrary, the

South-

Southwinds blowing, or the West and South-west, the Deal then alwaies relaxes that day, or at least is at a stay, provided this happen in the day time; for then, if in the night, not so much; and so this will do some considerable time before Rain.

6. By a constant observation of this Experiment of the Deals Motion and Rest, you may be able to know or guess at the Winds scituation without a Weather-cock, provided you have by you a common and a sealed *Thermometer*.

7. Also you may know the time of Year; for in the Spring it moves quicker and more than in Winter; in Summer it is more shrunk than in the Spring; in Autumn less in motion than in the Summer. Other Observations may be made more nice; these only in general at present.

Only I shall add this following Experiment with a Conjecture from thence. Considering with my self, that a Fagot or other Wood laid upon the fire, the heat then visibly causes moisture to come out of the Ends only. This occasioned the making of the following Experiment, to find whether then the moisture was not rarified out of the small Cylinder, like ends of the wood, only, or out of the sides also.

I took therefore seasoned Deal, two pieces, weighing the one piece and the other the night before; but the *ends* of the one piece I closed up with *Diachylon Plaster*, but the *sides* of this Deal I did not so close up; but left these sides with the other piece without *Diachylon*. Both being exposed to the open Air, they were found the next day both of them alike to have increased in proportion of Weight, which seems to prove, that the Sides also do take in and let out Moisture. Yet it doth appear, that in warmer weather Moisture passes freest and more out of the Ends of the wood, than it doth in colder weather.

From whence I do conjecture, that Deal-wood, as it hath a fit texture and body for *moisture* and *drought*, *heat* and *cold* and such like qualities to be discovered thereby, so it doth much like the same thing with what is also performed by the whole body of the outward mass of this globe of Earth; as may be made appear by forty other Experiments, not commonly known; yst this varying according to the time of year, and elime in Longitude and Latitude,

*The Explanation of the Second Contrivance, by a Circular Motion for an Annual Revolution; and first in the Outward parts; represented in Fig. II.*

AAAA, The frame of wood, for the Pannels of Deal to play loose in, at top and bottom.

BBBB, The Croffes of Deal or Iron fastened to the frame on each side; to which is annexed the Circular Index divided into 12; in the Center of which the Axletree *b* for the hands is placed.

CC, The two Pannels of slit-Deal, 3 foot deep, and 3 foot broad, a piece; fastened at each end of the Frame, with a distance left in the Middle for the scope of the Motion.

*The Explanation of the Inward work in Fig. III.*

AA, The two hands.

BB, The two Brass Pullies or Rollers, the one bigger, the other less; to the bigger a flat Leaden-weight is fastened with a Cat-gut string; to the smaller is fastened a small Silver-chain, which is by the Noose or loop of the brass *C* to be fastened to the Pannel under the middle of the cross, near the gap or scope for the Motion; and in that noose the Chain to have a fastening to be taken up or let down at pleasure.

D, The Roller or Pulley to be placed on the other Pannel opposite to the Noose, and near the gap or scope betwixt the two Pannels; over which Roller the small Chain, upon its return to the Axle-tree, is to be placed.

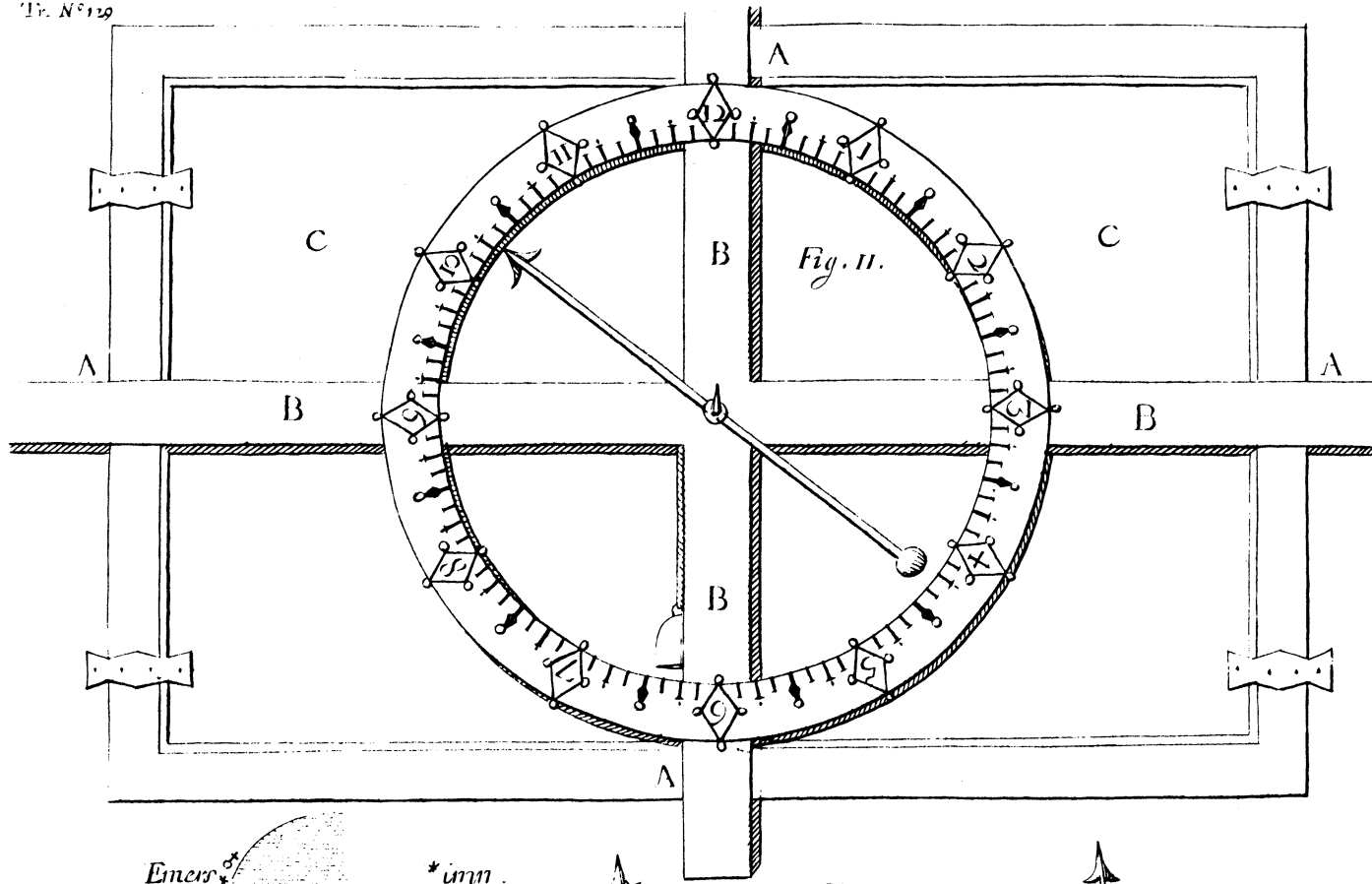
E, The Axletree upon which the two Rollers or Pullies *B, b*, are to be fastened, and the two hands *A A* for the Index.

F, The Weight annexed to the biggest Roller or Pulley *B*, and the string or Cat-gut to be moved, is to have the contrary posture for motion to the small Roller or Pulley upon which the Silver-chain is fastened: so that, as the shrinking of the Pannel moves the Axletree one way, the Relaxing may give way to the moving the hands or Axletree the other way by the power of the Weights drawing; which contrary postures will give the nicest account of this Motion.

*Note*, that the circumference of the smallest Pulley or Roller *Bb*, upon which the Chain is fastened, is to be no bigger than just so much scope or distance as the two Pannels make by the extremity of their utmost swelling or shrinking; and so one full revolution of the hand upon the Index may answer the fullest shrinking and swelling in the year, and the distance between the two Rollers or Pullies fixed upon the Axletree must be the thickness of your Pannels; so that the Weight is to play or move on the one side of the Pannel, and the Chain on the other, without disturbance or rubbing against the sides of the Pannel or the Cross, between which, out of sight, in the middle they are to be placed.

This way was so contrived before this time twelve-month, in the year 1675; some years after the former; and so with Chain and Pullies to avoid the shaking that would happen by applying the work of Pinnion and teeth to move the hands; which was then also propounded to Mr. *Tompion* the Watchmaker, but by him rejected, though I think that way may be used also with a Weight added to regulate the motion.

Now, as to the degree, to which the Deal-board, which shall serve for these Instruments, is to be seasoned, and for the kind, of which the same ought to be, you must take the finest straightest grain of your Dram-deal, as the best for this use, and let it lie drying in your house two or three years. And to know, whether it be sufficiently seasoned for this Instrument, take a small part thereof, and weigh it in a nice pair of Scales, and, if you find the weight thereof not to have increased many grains in wet weather, nor decreased many grains in dry, you may then conclude this Wood to be fit for your purpose.



Emer. \* imm.   
 Aug. 21. 1675   
 Fig. IV.

